REMARKS/ARGUMENTS

Reconsideration of this application is respectfully requested.

The current withdrawal of non-elected species claims is noted. However, it is also noted that claim 1 is clearly generic to all species and that, therefore, once claim 1 is found allowable, all claims directed to all claimed species should be rejoined and allowable in this same single application.

In order to facilitate the ultimate allowance of all dependent claims, a few of the current "withdrawn" dependent claims have been amended above so as to maintain consistency with amendments being made otherwise to the elected claims.

The rejection of claims 1 and 45 under 35 U.S.C. §102 as allegedly anticipated by Dawes '795 is respectfully traversed.

Claim 1 is now directed much more clearly to assembling different components onto a shared substrate and using one packaging layer for those different, assembled components. Embodiments of the applicant's invention can be used in wafer level packaging and can be used to produce sub-assemblies of components which can then be safely handled and tested prior to completing the construction of a whole piece of equipment.

Dawes does not describe an assembly of different components on a shared substrate at all. Dawes only discloses a way of fabricating a set of identical, planar waveguide devices. If a planar waveguide device according to Dawes were to be mounted on a substrate together with a different device, one cannot know if there would be a packaging layer at all.

Dawes does disclose the use of a hybrid material in an optical device, but always and only as an optical *"clad coating"* or *"cladding layer"* in relation to a core layer. In a waveguide, this is the material of lower refractive index which confines optical radiation to a core region of higher refractive index. For example, at 2:4-10 of Dawes, this is described as follows:

> *"To achieve planar optical waveguides, the current state of the art typically employs the following general process. First, a substrate is provided. The substrate is either silicon or silica, and is provided as a clean flat and smooth surface. In the case of a silicon substrate, a clad coating (a low index silica or silicate) is deposited. Next, a high index core layer (a silicate) is deposited on the substrate, with accurate thickness. ... Finally, a low index clad layer is deposited to complete the waveguide structure."*

Dawes is entirely consistent throughout his specification in referring to the clad layer as being present in a waveguide only for its optical properties.

The Examiner refers to 4:3-10, in alleging a packaging layer in Dawes. However, this still refers only to an optical cladding layer. Any optical waveguiding device has to have a core and a cladding layer. In a ridge waveguide, the cladding layer may simply be air, but it still has to be present in some form in order for waveguiding to occur. It is a question of the relationship between the refractive indexes of the core and the cladding layer. Dawes recognizes this again at 4:16-19, where he states:

> *"As is explained below, the index of refraction of this material can be designed to provide the high index cores and a low index cladding layer."*

The rejection of claims 1, 21-23, 28, 39 and 45 under 35 U.S.C. §102 as allegedly anticipated by Fallahi '613 is also respectfully traversed.

Fallahi describes an integrated arrangement in which active and passive functions are provided by a hybrid electronic device from a single substrate. Fallahi is not generally concerned with assembling separate devices at all, but very much with creating one hybrid electronic device. Almost all of Fallahi's independent claims (1, 29, 39, 44 and 53) are directed to:

"A method of [or for] producing a hybrid electronic device..."

The only remaining independent claim, claim 48, is directed to:

"A method of producing a surface emitting laser..."

Each of these hybrid devices is fabricated on a single substrate.

Sol-gel materials are used but primarily for their optical properties, not for providing packaging layers. Even where surface smoothness is important, this is not in a packaging sense but for optical reasons. For example, at 3:6-10, Fallahi states:

> *"Still a further object of the present invention is to provide a sol-gel with low internal loss and excellent surface smoothness to minimize both internal absorption of light and light scattering, both of which diminish optical transmission through a device."*

In embodiments of the applicant's invention, separately fabricated devices can be brought together onto a common substrate and packaged there (e.g., for testing purposes). Claim 1 as now amended specifies that the packaging layer *"is provided with at least one recess for use in assembling said components."* These recesses, or apertures, can be seen in the packaging layer 200 in Fig. 7 where they have first been created, in Figs. 10A and 10B where devices have been mounted into them and in

Fig. 12 where they are for giving access to electrically interconnecting mounting pads 1200.

The figures of Fallahi, in particular Figs. 17-22, show the passive and active sections of each hybrid electronic device as being fabricated on the same substrate. There is no hint of assembling a separately fabricated device onto the substrate, or of a packaging layer with recesses for that purpose.

This is not a minor difference. For example, there are no electrical contact problems to solve in Fallahi. The contacts in Fallahi can be simply provided during fabrication in a known manner. For example, Figs. 17-18 show a *"backside contact 74"* across the whole lower surface of the substrate 72. Electrical bias is provided through the whole depth of two grating outcouplers 64 and 78 while a laser diode or gain section 60 has a contact 66 on its uppermost surface.

The applicant's claims 29, 40 and 41 (when rejoined upon allowance of generic claim 1) are relevant in this respect, setting out forms of electrical interconnects that have to be accommodated by one or more apertures in the packaging layer or layers.

The applicant has recognized much greater versatility in the use of a hybrid glass material and taken its usage into the new area of wafer-based assemblies in which the components are not fabricated *in situ*, but assembled, bringing the problems of electrical interconnect arrangements as well as potentially different starting materials and fabrication technologies.

It is believed that claim 1 as now amended is clearly distinguished with regard to Fallahi. In particular, this is found in the provision of the glass packaging material with at least one recess for use in assembling the components. This is distinctive in embodiments of the applicant's invention where different, pre-fabricated devices can be assembled together to cooperate.

The rejection of claims 14 and 40-42 under 35 U.S.C. §103 as allegedly being made "obvious" based on Fallahi in view of Tabucci '524 is also respectfully traversed.

Fundamental deficiencies of Fallahi have already been noted above with respect to, for example, parent claim 1. Tabucci does not supply those deficiencies. In addition, even if Tabucci is arguably combinable in some fashion with Fallahi, one would still not arrive at the applicant's now claimed invention.

Tabucci shows the use of sub-mounts for assembling devices onto a shared substrate as an optical bench. This is in strong contrast to Fallahi which shows different devices being fabricated onto a shared substrate with a single *"backside contact 74."*

If one were to combine Tabucci and Fallahi *arguendo*, one would never think of taking a flip-chip laser diode and trying to put it onto the Fallahi substrate. There would, for example, be no way of providing electrical drive. All the structures of Fallahi depend on the backside contact 74. If one tried to flip-chip mount a laser diode onto the Fallahi substrate, its contacts would be completely buried.

Alternatively, one might consider combining these two disclosures the other way around. One might consider putting one of Fallahi's hybrid devices onto a Tabucci sub-mount. However, Tabucci is concerned with physical alignment by means of grooves and ridges and does not disclose a packaging layer as required by the applicant's amended claim 1. The presence of a Fallahi hybrid device would not supply this deficiency.

Given the deficiencies already noted with respect to the cited references, it is not believed necessary at this time to explain additional deficiencies of these references with respect to other aspects of the rejected claims. Suffice it to note that, as a matter of law, it is impossible to support even a *prima facie* case of anticipation or obviousness

unless at least the cited collection of prior art teaches or suggestions each and every feature of the rejected claims.

Accordingly, this entire application (including all of the earlier "withdrawn" non-elected species claims) is now believed to be in allowable condition. A formal notice to that effect is earnestly solicited.

Respectfully submitted,

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